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A STUDY OF APPLE PRODUCTION
IN THE
OKANAGAN VALLEY OF BRITISH COLUMBIA

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1949

D. W. WARE, E. D. Woodward
and
H. W. Trevor



Canada

DEPARTMENT OF AGRICULTURE

Marketing Service - Economics Division

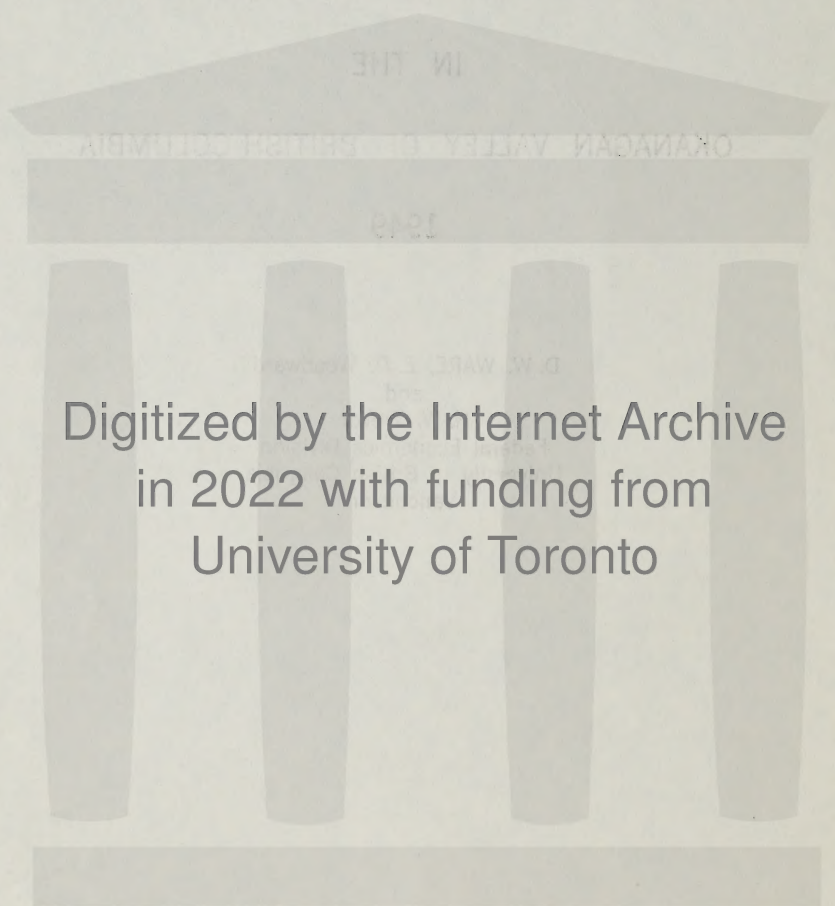
Ottawa, January 1952



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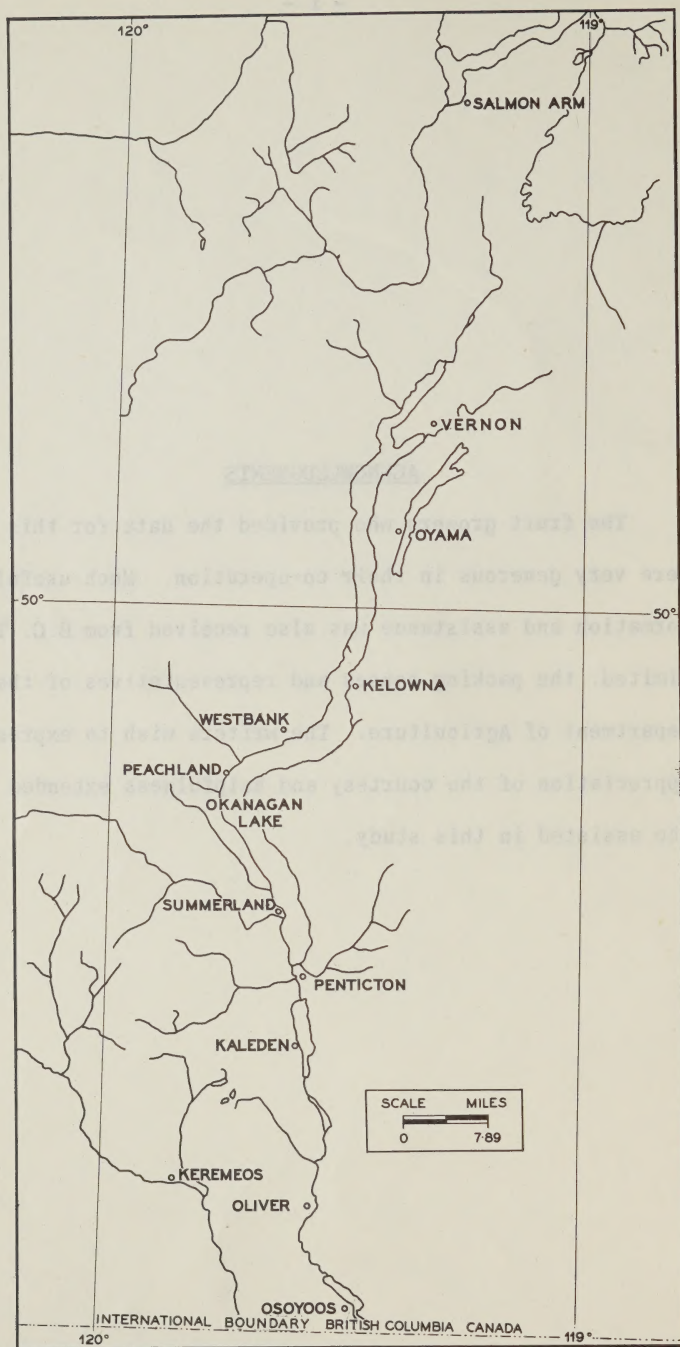


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LOCATION OF OKANAGAN VALLEY ORCHARD DISTRICTS
IN WHICH THIS STUDY WAS CONDUCTED

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A STUDY OF APPLE PRODUCTION IN THE OKANAGAN VALLEY BRITISH COLUMBIA 1949

D.W. Ware, E.D. Woodward and H.W. Trevor

INTRODUCTION

The total plantings of all tree fruits in British Columbia occupy 35,000 acres, of which 24,000 acres are in the Okanagan Valley. Apples have been, and still are, the most important tree fruit produced in the Okanagan where they account for three-quarters of the total tree fruit acreage. 1/

The commercial tree fruit industry in the Okanagan Valley had its beginning in 1892 when Lord Aberdeen planted 200 acres of orchard on each of his ranches, the Gulsachan at Kelowna and the Coldstream at Vernon. Subsequently other ranchers planted large orchards, while some divided their holdings into 10-20 acre lots and started irrigation projects. Land values increased from \$1 per acre in 1898 to approximately \$1,000 per acre in 1908. 2/

In 1903 the first carload of fruit was exported to Great Britain by Messrs. Sterling and Pitcairn of Kelowna. Production and planting increased rapidly, and by 1911 the annual production was almost a million boxes. Many orchards had been planted by people having little or no experience in fruit growing and this resulted in the production of a wide variety of apples, some of which proved to have a limited market. During the war years, 1914-18, few new trees were planted and following the war, many trees of undesirable varieties were removed. Since then varieties better suited to the environment and market requirements have been planted.

Production of apples in the Okanagan Valley had increased to 4,557,236 boxes by 1939, and in the year 1946 an all-time high of 6,764,593 boxes was reached. In 1948 the number of apples produced in the Okanagan Valley was 5,458,873 boxes valued at \$12,064,109. 3/

PURPOSE OF THE STUDY

At the request of the industry, a survey of apple orchards in the Okanagan Valley was undertaken in the spring of 1949. The objectives of this survey were threefold; (1) to study the organization and financial returns of the orchards during the year of study; (2) to determine some of the factors responsible for the variation in operator income; (3) to secure information on apple production in the Okanagan Valley as part of a general study of Canada's apple industry.

METHOD OF STUDY

Enumerators visited 165 orchardists from Salmon Arm in the North to Osoyoos in the South, and obtained from each a record of his farm business

- 1/ Canada, Dominion Bureau of Statistics, Census of Agriculture, British Columbia, 1941, p. 36.
- 2/ Ormsby, M.A., A Study of the Okanagan Valley of B.C., Master's Thesis, the University of British Columbia, 1931, p. 84.
- 3/ Agricultural Statistics Report, Department of Agriculture, Victoria, B.C. 1948, p. 18.

for the year 1948-49. Care was taken to include orchards of different sizes. However, orchards smaller than five acres were excluded as they were considered largely non-commercial. A representative sample was taken from the remaining two-thirds which were considered truly commercial orchards.

Because of climatic and cropping differences, the Okanagan Valley has been divided into Northern, Southern and Salmon Arm districts for purposes of analysis. The number of records obtained from each district was proportional to the number of orchards of five acres or more in the locality. Since Tree Fruit Board data showed that 54.5 per cent of these farms are to be found south of Kelowna, an approximately equal percentage (52.7 per cent) of the sample was drawn from that area.

The Southern Okanagan (87 records) consists of Osoyoos, Oliver, Kaledan, Okanagan Falls, Penticton, Naramata, Summerland, Peachland, Westbank and Keremeos districts. The Northern Okanagan (66 records) consists of Kelowna, Winfield, Oyama, Okanagan Centre and Vernon districts. The Salmon Arm district (12 records), the only non-irrigated area from which records were obtained, is considered separately.

DESCRIPTION OF THE AREA

Location and Extent

The Okanagan district extends in a northerly direction from the 49th parallel to north $50^{\circ} 45'$; the average longitude is $119^{\circ} 30'$ west. The total length of the valley is approximately 120 miles and the width varies from 12 miles at Armstrong in the north to about five miles at Oliver in the south. 1/

Drainage

The Northern Okanagan district is drained by the Shuswap and Salmon Rivers which rise in the hills to the east and flow northward into Shuswap Lake which in turn is drained by the South Thompson into the Fraser River.

The Southern Okanagan is drained by several lakes, the principal one being Okanagan Lake which is 69 miles long, about two miles wide and has an extreme depth of about 760 feet. 2/ The Okanagan River flows from the southern end of Okanagan Lake through Skaha, Vaseaux and Osoyoos Lakes southward to the Columbia River.

Soils

The Okanagan soils are complex and varied. The material from which they were formed is the till deposited directly by the ice sheet. The general distribution of minerals is rich and is more or less the same throughout the valley. The deficient elements are mainly boron and iodine.

The chief soil distinctions stem from the variations in texture and surface relief and the effects of several climatic regimes. Gravelly and sandy soils are dominant in the fruit growing areas.

1/ Soil Survey of the Okanagan and Similkameen Valleys, British Columbia, C.C. Kelley and R.H. Spilsbury Report No. 3, B.C. Survey 1949, p. 7.

2/ The Okanagan Valley, B.C. Dept., of Agriculture, Circular No. 40, 1945, p. 6.



Left - Cutting out old and damaged trees at Vernon.
Right - Hilly orchard country between Penticton and
Naramata.



Orchards at Kelowna



Orchards at Oliver

Climate

The Okanagan Valley has a series of climatic zones which express themselves by changes in the native plant life. The mixed forest region in the north changes gradually to desert flora in the south. This change from a cool zone to succeeding warmer desert zones is accompanied by a lengthening of the growing season which influences cropping practices to a marked degree. The influencing climatic factors are given in Table. 1. The figures listed for temperature and precipitation are 20-year averages, while those for the frost free period and length of growing season are 10-year averages

Table 1.- Temperature, Annual Precipitation, Frost Free Period, Length of Growing Season and Altitude, Okanagan Valley

Station	Temperature			Annual	Frost	Length	Altitude
				Year	Precipitation	Free	
	Highest	Lowest	Average			Period	
	degrees F.	degrees F.	degrees F.	inches	days	days	
Salmon Arm	106	-31	46	18.95	116	199	1,100
Vernon (Coldstream)	104	-29	45	14.62	144	200	1,383
Kelowna	102	-17	46	11.89	150	200	1,200
Summerland	104	-17	48	10.33	176	212	1,300
Penticton	105	-12	48	10.98	152	217	1,121
Oliver	111	-21	50	9.13	162	226	995

Source: The Okanagan Valley, B.C. Department of Agriculture, Circular No. 40, 1945, p. 7.

Changes in Apple Varieties

In order to meet ever increasing competition, the policy of the marketing agency, B.C. Tree Fruits Limited, is to encourage the production of only the most marketable apple varieties - Delicious, McIntosh and Winesap. Accordingly the apple growers are continually removing old or damaged trees and replacing them with the recommended varieties. From 1940 to 1945 the number of apple trees in the Okanagan Valley decreased by 39,812; yet Delicious, McIntosh and Winesap increased by 22,710, 15,598 and 11,346 trees, respectively. 1/ Newtown, Jonathan, Wealthy and 'Other' varieties decreased by 5,157, 13,004, 9,601 and 61,704 trees, respectively.

The decrease in the total number of apple trees is due in part to the need for more space between trees which were originally planted too closely. Research and experience have shown that production and quality are maintained at a higher level, and work, such as spraying and thinning, is facilitated when apple trees are planted farther apart.

1/ Orchard Survey of the Okanagan Horticultural District, Horticultural Branch, Department of Agriculture, Victoria, B.C., 1940, 1945.

Distribution of Apple Varieties by Area

The importance of the individual varieties which make up the total number of apple trees on the average farm in each area studied is illustrated in Table 2. The difference in the percentage of the varieties grown reflects the change in climate from Vernon to Osoyoos.

Table 2.- Percentage of Apple Varieties, 153 Okanagan Valley Orchards, 1948-49

	No.	Variety							
	of	McIn-	Delic-	Jona-	New-				
District	Records	tosh	cious	than	Winesap	town	Wealthy	Other	Total
- average percentage per orchard -									
Vernon	21	40.7	20.4	4.5	4.7	0.3	11.3	18.1	100
Oyama	11	44.1	23.1	7.9	6.1	6.5	-	12.3	100
Kelowna	34	44.2	23.4	10.3	3.7	6.0	3.9	8.5	100
Westbank	11	27.2	22.7	10.3	3.4	10.0	1.5	24.9	100
Peachland	7	35.0	30.7	12.9	6.1	3.4	3.1	8.8	100
Summerland	14	20.5	15.6	14.6	3.8	35.3	0.6	9.6	100
Penticton	25	12.6	28.0	14.9	16.7	18.2	0.2	9.4	100
Kaleden	7	4.2	12.9	18.7	12.0	51.5	-	0.7	100
Keremeos	8	5.4	45.0	11.3	21.6	10.7	-	6.0	100
Oliver	9	0.6	25.1	4.5	46.6	5.6	-	17.6	100
Osoyoos	6	1.4	36.6	0.8	51.2	7.2	-	2.8	100

The distribution of apple varieties in the Okanagan Valley as a whole is shown in Table 3.

Table 3.- Percentage of Apple Varieties Grown in the Okanagan Valley, 1945 a/

Variety							Total
McIntosh	Delicious	Jonathan	Winesap	Newtown	Wealthy	Other	
- per cent -							
27.7	22.2	11.7	10.1	10.0	3.4	14.9	100

a/ Orchard Survey of the Okanagan Horticultural District, Horticultural Branch, Department of Agriculture, Victoria, B.C., 1945. Percentages are calculated only for districts studied in the 1948-49 study.

Age of Trees

In Table 4 it will be seen that the majority of apple trees on the farms surveyed were more than 20 years old. Pear and cherry trees in this age group

made up a larger percentage of the total than in any other age group, followed closely in both cases by the one to five year group, indicating heavy new plantings. The largest age group of peach trees was the 11 to 20 year group and the largest group of apricots was between one and five years of age.

Table 4.- Percentage Distribution of Trees of Various Kinds by Age Groups, 153 Okanagan Valley Orchards, 1948-49

Kind of Tree	Age Groups				Total
	1-5 yrs.	6-10 yrs.	11-20 yrs.	Over 20 yrs.	
	- per cent -				
Apple	7.7	8.3	18.8	65.2	100
Pear	31.2	13.9	21.9	33.0	100
Peach	17.2	28.5	48.2	6.1	100
Apricot	37.0	22.3	14.9	25.8	100
Cherry	28.0	15.3	22.1	34.6	100

THE FARM OPERATORS AND THEIR FAMILIES

Of the orchardists visited, 70 had resided on their farms less than eight years, 20 had lived there for eight to 15 years and the remaining 63 had been 16 years or longer on their premises.

All age groups were represented, nine per cent of the 153 co-operators being under 31 years of age, 29 per cent between 31 and 45, 40 per cent between 46 and 60 and 23 per cent aged 61 or older.

The average number of people living in the farm home was 3.4, made up of an average of 2.4 adults and one child. Persons 15 years of age or older were assumed to be adults for the purposes of this study.

FARM ORGANIZATION

Land Use

The farms in the survey had an average of 10.7 acres of bearing apple trees, 1.2 acres of non-bearing apple trees, 3.2 acres of other fruit, 1.6 acres of field crops, 0.7 acres of pasture, 6.6 acres of waste and unimproved land and 0.4 acres used for the farmstead. The average acreage per farm was, therefore, 24.4 acres.

In the Northern Okanagan the average orchard was 5.6 acres larger than its counterpart in the South. The detailed average pattern of land use for these areas is shown in Table 5.

Fifty-three of the 153 co-operators had land suitable for setting out new orchards. The average acreage available for this purpose on these 53 farms was six acres.

Table 5.- Land Use, 147 ^{a/} Okanagan Valley Orchards, 1948-49

Item	Acreage per Farm					
	Northern Okanagan:		Southern Okanagan:		All Okanagan	
	(63 records)		(84 records)		(147 records)	
	Acres:	% of total	Acres:	% of Total	Acres:	% of Total
	Acres		Acres		Acres	
Bearing Apples ^{b/}	14.4	49.3	8.0	37.9	10.7	43.8
Non-Bearing Apples	1.9	6.5	0.7	3.4	1.2	4.9
Other Fruit	2.1	7.2	4.1	19.4	3.2	13.1
Total Orchard	18.4	63.0	12.8	60.7	15.1	61.8
Field Crops	2.9	9.9	0.6	2.8	1.6	6.6
Pasture	1.1	3.8	0.4	1.9	0.7	2.9
Unimproved Land	1.4	4.8	2.0	9.5	1.7	7.0
Waste Land	4.9	16.8	4.9	23.2	4.9	20.1
Farmstead	0.5	1.7	0.4	1.9	0.4	1.6
Total Other Land	10.8	37.0	8.3	39.3	9.3	38.2
Total Land	29.2	100.0	21.1	100.0	24.4	100.0

^{a/} Three Northern Okanagan and three Southern Okanagan records omitted because of incomplete information regarding land use.

^{b/} Trees under 10 years of age for the purposes of this table.

Farm Capital

The average investment was \$25,815 per farm in the Northern Okanagan and \$28,880 per farm in the Southern Okanagan. In both areas, the major investment was in orchard land (Table 6).

Buildings.— The main building on most tree fruit farms is the dwelling house. These farms are highly specialized. In the majority of cases the only other buildings are inexpensive shelters for pickers and machinery and equipment. The average investment in buildings in all districts was \$6,092.

Land.— The value placed on orchard land varied with locality. The average value per acre of orchard by districts was as follows: Vernon \$686, Kelowna \$956, Oiyama \$1,096, Westbank \$936, Peachland \$1,145, Summerland \$1,360, Penticton \$1,806, Kaleden \$1,528, Keremeos \$790, Oliver \$1,642 and Osoyoos \$1,650.

Livestock.— Livestock was of little importance on Okanagan Valley fruit farms because the high value of land prohibited the growing of feed or pasture. Of the 153 farms surveyed, nine per cent reported owning horses, 21 per cent cattle, eight per cent hogs and 49 per cent poultry.

Table 6.- Distribution of Farm Capital, Average Value and Percentage of Total, 153 Okanagan Valley Orchards, 1948-49

Item	Northern Okanagan		Southern Okanagan		Total Okanagan	
	(66 records)		(87 records)		(153 records)	
	Average Value and Percentage of Total					
	\$	%	\$	%	\$	%
Dwelling Houses	3,882	15.0	4,928	17.1	4,477	16.3
Picker's Camp	615	2.4	463	1.6	529	1.9
Other Buildings	1,186	4.6	1,011	3.5	1,086	3.9
Orchard Land	16,122	62.5	18,927	65.5	17,717	64.3
Other Land	630	2.4	542	1.9	580	2.1
Total Real Estate	22,435	86.9	25,871	89.6	24,389	88.5
Machinery & Equip.	3,196	12.4	2,918	10.1	3,039	11.0
Livestock	154	0.6	64	0.2	103	0.4
Feed & Supplies	30	0.1	27	0.1	28	0.1
Total Capital	25,815	100.0	28,880	100.0	27,559	100.0

Power Equipment.- Tractors were owned by 111 of the 153 orchardists included in the Northern and Southern Okanagan districts (Table 7.). The average value per tractor was \$1,070 and the average yearly cash operating expense was \$193, of which 72 per cent was for fuel and oil.

Table 7.- Tractors, Trucks and Automobiles, 153 Okanagan Valley Orchards, 1948-49

Size of Farm : No. of:		Number of farms having item					
in Crop Acres:	Farms:	Tractor	Per Cent:	Truck	Per Cent:	Auto	Per Cent
5 - 14.9	93	55	59	31	33	66	71
15 - 24.9	34	31	91	17	50	28	82
25 - 34.9	13	12	92	6	46	13	100
35 and over	13	13	100	12	92	13	100
Total	153	111	72.5	66	43	120	78

There were 66 farmers operating trucks having an average value of \$864 per truck. These were driven an average of 3,126 miles during the year, of which 2,304 miles were chargeable to the farm. Average cash operating expenses were \$267 per year.

Automobiles were owned by 120 of the operators. Fifty-eight per cent of these cars were eight or more years old. Each was driven approximately

6,101 miles during the year with an average cash operating expense of 5.7 cents per mile.

When sorted into size groups on the basis of crop acreage (Table 7) the larger farms tended to be the most highly mechanized.

Other Equipment.— Other equipment included such items as sprayers, spraying costumes, picking bags, pruning shears and saws, ladders, props, harrows, discs, cultivators, plows and small tools. The average value of all these items was \$1,340 per farm.

FARM PRACTICES

Spraying

The general spraying practice in the Valley consisted of a dormant and pre-pink spray of lime sulphur and three cover sprays of D.D.T. and Parathion. The lime sulphur was applied at an average rate of six to nine gallons per tree and the D.D.T. and Parathion at an average rate of 10 to 15 gallons per tree.

Fertilizer

On most of the orchards surveyed commercial fertilizers were used as there was very little manure available. Cover cropping with clover, alfalfa or wild grasses and weeds was practised on most of the orchards especially in the cases of orchards using sprinkler irrigation.

Sprinkler Irrigation

There were 56 orchardists who had, or were installing sprinkler irrigation systems; the remainder irrigated by the furrow method. The average acreage under sprinkler irrigation was 16.3 acres per farm. The cost of installation amounted to an average of \$115 per acre, or \$1,866 per farm. In cases where the operator had to install pumps to develop sufficient pressure, the average cost of installation was \$143 per acre as compared with \$104 per acre in cases where no pumps were needed. An average of 294 hours per farm or 18.6 hours per acre were spent on irrigation.

Table 8.— Average Costs per Farm and per Acre, for Sprinkler Irrigation, 23 Okanagan Valley Orchards, 1948-49

Item	Cost per Farm	Cost per a/ Irrigated Acre
	- dollars -	
Unpaid Labour	150.74	9.55
Hired Labour	53.17	3.37
Water Taxes & Tolls	229.65	14.56
Repairs & Materials	19.91	1.26
Total Cost	453.47	28.74
a/ 15.8 acres per farm.		

FARM RECEIPTS

Sources of Farm Receipts

The sources of farm revenue are shown in Table 9. The significant thing one learns from a study of this table is the dependence of the Okanagan farm economy on fruit. In the Northern Okanagan 88.9 per cent of the cash receipts was from the sale of fruit; the corresponding figure in the Southern Okanagan was 9.26 per cent. A smaller portion of total revenue was derived from the sale of soft fruit in the Northern Okanagan than in the Southern Okanagan.

Table 9.- Average Cash Income from Different Sources, 153 Okanagan Valley Orchards, 1948-49

Source	Northern Okanagan (66 records)		Southern Okanagan (87 records)		All Okanagan (153 records)	
	Average per Farm and Percentage of Total Revenue					
	\$	%	\$	%	\$	%
Apples	6,718	77.0	4,037	55.7	5,194	65.9
Other Fruit	1,039	11.9	2,674	36.9	1,969	25.0
Rebate	593	6.8	278	3.8	414	5.3
Field Crops	77	0.9	29	0.4	50	0.6
Livestock	85	1.0	40	0.6	59	0.7
Miscellaneous <u>a/</u>	206	2.4	191	2.6	197	2.5
Total	8,718	100.0	7,249	100.0	7,883	100.0

a/ Miscellaneous income included such items as custom work, trucking and labour off the farm.

A comparison of these two areas indicates that the average orchard in the North received a higher gross income than the average orchard in the South. However, when computed on the basis of returns per orchard acre, the returns in the North were \$422 as compared with \$524 in the South.

Capital Receipts

The revenue derived from the sale of farm machinery was classified as capital receipts. Receipts from this source amounted to an average of \$130 per farm in the Northern Okanagan and an average of \$83 per farm in the Southern Okanagan.

Change in Inventory

The change in inventory from the beginning to the end of the year is a receipt or expense that is often overlooked by farmers. There were average net inventory increases of \$768 and \$324, respectively, on orchards in the Northern and Southern districts during the year of the study.

FARM EXPENSES

Current Expenditures

The average total operating expense per farm in the Northern and Southern Okanagan was \$5,457 and \$4,377, respectively. The operating expenses per farm varied with the size, locality and condition of the orchard and with the efficiency of the management.

Hired labour was the largest single item of expense in both areas, accounting for 46 per cent and 49 per cent of the total current expenses on farms in the Northern and Southern districts, respectively. Unpaid family labour was of greater importance on the orchards in the Northern Okanagan than on those in the South.

In both areas the principal items of expense were hired labour, operation of equipment, spray material, unpaid family labour, irrigation and fertilizers.

Table 10.- Distribution of Current Expenses
153 Okanagan Valley Orchards, 1948-49

Item	Northern Okanagan		Southern Okanagan		All Okanagan	
	Average Expense per Farm	Percentage of Total	Average Expense per Farm	Percentage of Total	Average Expense per Farm	Percentage of Total
	\$	%	\$	%	\$	%
Hired Labour	2,529	46.3	2,150	49.1	2,314	47.8
Unpaid Family Labour	537	9.8	205	4.7	348	7.2
Irrigation	309	5.7	224	5.1	260	5.4
Fertilizers	229	4.2	244	5.6	239	4.9
Spray Material	437	8.0	328	7.5	374	7.7
Tractor Work Hired	-	-	5	0.1	3	0.1
Spraying Hired	100	1.8	71	1.6	84	1.7
Trucking Hired	140	2.6	156	3.6	149	3.1
Other Custom Work Hired	60	1.1	44	1.0	51	1.1
Operation of Equipment	522	9.6	361	8.2	430	8.9
Cull Charges	137	2.5	86	1.9	108	2.2
Trees Bought	39	0.7	47	1.1	44	0.9
Boxes and Crates	26	0.5	6	0.1	14	0.3
Repairs & Maintenance	86	1.6	77	1.8	80	1.6
Insurance	30	0.5	30	0.7	30	0.6
Taxes	80	1.5	143	3.3	116	2.4
Livestock Expenses	85	1.6	69	1.6	76	1.6
Miscellaneous	111	2.0	131	3.0	123	2.5
Total	5,457	100.0	4,377	100.0	4,843	100.0

Capital Expenditures

A number of operators purchased new machinery and equipment or livestock, or made improvements to their buildings during the year. The average capital expenditure on all the farms surveyed was \$1,109 per farm, made up of \$671 for new equipment, \$16 for livestock and \$422 for improvements.

Expenditures on Apples

Many items of expense such as labour, fertilizer, spray, trucking, use of equipment and taxes are joint expenses and must be apportioned, therefore, to the various crops produced. All joint expenses were allocated on the basis of the percentage of bearing apple acres to total crop acres.

Of all items of expense in producing apples on the 153 orchards studied, labour, use of land, use of equipment, sprays and irrigation accounted for 86.3 per cent of the total (Table 11). Other items such as trucking, cull charges, use of buildings, insurance, short-term interest and miscellaneous expenses were individually of minor importance.

Table 11.- Total Expenses in Producing Apples, 153 Okanagan Valley Orchards, 1948-49

Item	Total Expense		Expense per Acre
	per Orchard		of Bearing Apples
	\$	%	\$
Labour	1,869 ^{a/}	44.5	170.82 ^{a/}
Use of Land:			
Interest	488	11.6	44.58
Taxes	76	1.8	6.94
Use of Equipment	651	15.5	59.52
Sprays	351	8.4	32.04
Irrigation	189	4.5	17.24
Fertilizers	175	4.2	16.02
Trucking	111	2.6	10.14
Cull Charges	108	2.5	9.78
Use of Buildings	68	1.6	6.18
Insurance	21	0.5	1.89
Short-Term Interest	12	0.3	1.15
Miscellaneous	85	2.0	7.77
Total	4,204	100.0	384.07

^{a/} Includes hired and family labour, but no allowance is made for the operators' labour on the farm.

LABOUR

Labour, both hired and unpaid, made up 44.5 per cent of the expenditure on apple production on the average farm in the survey. Unpaid labour was computed at the going rates for hired labour. Few operators kept hired help all the year, seasonal labour being the most frequent type hired. An analysis of the actual time spent on orchard operations is shown in Table 12.

The labour performed in apple orchards may be classified under two main headings: firstly, those operations which are concerned with the care and development of the apples until they are ready to be harvested; secondly, those operations which are concerned with the harvesting and movement of the apple crop.

In the first group are such operations as pruning, cultivating, irrigation, spraying, thinning and other miscellaneous orchard operations. These operations took 69.3 per cent of the labour expended or an average of 3.89 hours per tree (Table 12). The major items were thinning, 1.51 hours per tree, and pruning, 1.04 hours per tree.

The second group, made up of picking, loading and hauling, took an average of 1.72 hours per tree; picking took 1.42 hours per tree.

Table 12.- Average Number of Man Hours of Labour Required Per Tree,
153 Okanagan Valley Orchards, 1948-49

Item	Man Hours Per Tree					
	Northern Okanagan		Southern Okanagan		All Okanagan	
	Hrs.	%	Hrs.	%	Hrs.	%
Pruning	.90	16.0	1.23	22.0	1.04	18.5
Cultivating	.07	1.2	.04	0.7	.06	1.1
Irrigating	.45	8.0	.45	8.0	.45	8.0
Spraying	.24	4.3	.32	5.7	.27	4.8
Thinning	1.54	27.5	1.46	26.1	1.51	26.9
Other	.60	10.7	.52	9.3	.56	10.0
Total Growing	3.80	67.7	4.02	71.8	3.89	69.3
Picking	1.49	26.6	1.32	23.6	1.42	25.3
Loading & Hauling	.32	5.7	.26	4.6	.30	5.4
Total Harvesting	1.81	32.3	1.58	28.2	1.72	30.7
Total Labour	5.61	100.0	5.60	100.0	5.61	100.0

FINANCIAL SUMMARY

The average difference between total farm receipts and total farm expenses on all farms studied was \$2,550 (Table 13). This figure called 'farm income' is the amount the operator received for his work on the farm and interest on

invested capital. In order to obtain the figure representing return to the operator for his labour, interest at four per cent was deducted from the farm income leaving an average 'labour income' of \$1,448. In addition to labour income, the farmer receives for his labour and management the use of the farm house and products raised and consumed on the farm. These items are called 'perquisites' and, when added to labour income, give the measure known as operator's 'labour earnings'. The operator's labour earnings represent the total returns to the operator for his labour and management after all cash and non-cash expenses are deducted. The average value of perquisites for the 153 farms surveyed was \$668, which, added to the labour income, gave labour earnings amounting to \$2,116 per farm.

Table 13.- Average Financial Summary, 153 Okanagan Valley Orchards,
1948-49

	Northern Okanagan (66 Orchards)	Southern Okanagan (87 Orchards)	All Okanagan (153 Orchards)
		- dollars -	
Cash Receipts	8,718	7,249	7,883
Capital Receipts	130	83	103
Net Inventory Increase	768	324	516
Total Farm Receipts	9,616	7,656	8,502
Current Expenses	5,457	4,377¼	4,843
Capital Expenses	1,340	933	1,109
Net Inventory Decrease	-	-	-
Total Farm Expenses	6,797	5,310	5,952
Farm Income	2,819	2,346	2,550
Interest on Investment (4%)	1,033	1,155	1,102
Labour Income	1,786	1,191	1,448
Perquisites	619	705	668
Labour Earnings	2,405	1,896	2,116

The average labour income was \$1,786 per farm in the Northern Okanagan, and \$1,191 per farm in the Southern Okanagan. Comparison of the labour incomes for the two areas on a crop acre basis gave an average labour income of \$84 and \$89 per crop acre for the Northern and Southern Okanagan districts, respectively.

VARIATIONS IN RETURNS

Labour Income is the measure used to compare the returns from the operation of the orchards in this study. Twenty-four per cent of the operators in the Northern Okanagan had labour incomes of \$3,000 or more, 52 per cent had labour incomes between \$1 and \$2,999, 14 per cent had labour incomes between -\$1 and -\$999, and 10 per cent had minus labour incomes of \$1,000 or more.

In the Southern Okanagan, 19 per cent of the operators had labour incomes of \$3,000 or more, 57 per cent had labour incomes between \$1 and \$2,999, eight per cent had labour incomes between -\$1 and -\$999, and 16 per cent had negative labour incomes of \$1,000 or more.

A feature of both groups was the great variation between individual orchards.

Table 14.- Distribution by Labour Income, 153 Okanagan Valley Orchards, 1948-49

Labour Income per Orchard	Northern Okanagan		Southern Okanagan		All Okanagan	
	Number of Orchards and Percentage in Group					
	No.	%	No.	%	No.	%
<u>Plus</u>						
\$4,000 or more	10	15.2	10	11.5	20	13.1
3,000 to 2,999	6	9.1	6	6.9	12	7.8
2,000 to 1,999	6	9.1	6	6.9	12	7.8
1,000 to 1,999	12	18.2	19	21.8	31	20.3
1 to 999	16	24.2	25	28.7	41	26.9
<u>Minus</u>						
1 to 999	9	13.6	7	8.1	16	10.4
1,000 or more	7	10.6	14	16.1	21	13.7
Total	66	100.0	87	100.0	153	100.0

FACTORS AFFECTING LABOUR INCOME

Many things influence the size of labour income. Factors such as frost, rainfall and crop failure are beyond the grower's control. However, there are other factors such as yield, percentage of culls, labour efficiency and size of business which to a large degree are amenable to the control of the grower. In addition, the price received for the product will affect the size of the farmer's returns. Price will depend to a large extent on the variety, quality and demand for the fruit. Of these factors, variety and grade may be influenced to some extent by the grower. Other factors such as location and soil are difficult to correlate in a study of this kind.

Yield

As noted in Table 4, many orchards had a large number of apple trees between the ages of six and 10 years. Since some of these trees were not in full bearing, it was necessary to convert them to the equivalent of bearing trees. This was done by considering one acre occupied by such trees to be equal on the average to one-half acre of bearing trees. This is the definition of an 'adjusted acre'.

In order to modify the effect of income from fruit other than apples, the 153 records were divided into two groups as follows: Group I, those receiving less than 70 per cent, and Group II, those receiving 70 per cent or more of their income from apples. Each group was then sub-sorted on the basis of yield per adjusted acre. As might be expected, there was a consistent increase in the average labour income as the yield of apples increased (Table 15).

Table 15.- Relation of Yield of Apples per Adjusted Acre and Other Factors to Labour Income, 153 Okanagan Valley Orchards, 1948-49

Yield per Adjusted Acre in Packed Boxes	No. of Records	Average Yield per Adjusted Acre	Per Cent				Labour Income
			Culls	Extra Fancy	Desirable Varieties		
		boxes	%	%	%		\$
<u>Group I</u>							
Less than 70% of	Less than 400	35	270	18	31	71	709
Income from	400 to 599	28	492	16	28	76	1,351
Apples	600 and over	8	659	14	22	73	2,814
<u>Group II</u>							
70% or more	Less than 400	24	305	14	38	79	-338
of Income from	400 to 599	35	494	12	38	73	1,925
Apples	600 and over	23	765	18	27	70	3,373

Percentage of Culls

In Table 16, Groups I and II were sub-sorted on the basis of percentage of culls. Generally, as percentage of culls increased, labour income decreased. The combined effect of high yield and low percentage of culls resulted in high labour incomes. An exception appears, however, in Table 16, Group II where it is shown that 19 growers with 26 per cent culls had higher average labour incomes than 38 growers with only 14 per cent culls. Since in each case 439 boxes per adjusted acre were sold, this may reflect the influence of a higher quality pack, as well as high yield, offsetting the heavier rate of culling.

The average percentage of culls per farm was 17 per cent in the Northern Okanagan and 14 per cent in the Southern Okanagan. Growers in the North sold an average of 420 packed boxes per adjusted acre as compared with 366 packed boxes in the South. The 153 operators received an average gross return of \$1.19 per packed box sold plus an additional rebate of six cents per box.

Table 16.- Relation of Percentage of Culls to Labour Income,
153 Okanagan Valley Orchards, 1948-49

	Percentage of Culls	Number of Records	Average		Labour Income
			Per Cent Culls	No. of Boxes Sold per Adjusted Acre	
			%	boxes	\$
<u>Group I</u>					
Less than 70%	0-10	17	7	398	2,385
of income from	11-20	37	15	344	1,033
Apples	more than 20	17	31	247	375
<u>Group II</u>					
70% or more of	0-10	25	7	429	2,251
Income from	11-20	38	14	439	1,350
Apples	more than 20	19	26	439	1,542

Labour Efficiency

One measure of labour is the productive man work unit. This term represents the amount of directly productive work accomplished by one man under average conditions in a 10-hour day. It is used as a standard measure of the amount of work to be done on the farm and does not indicate the amount of labour actually used in getting the work done. The number of productive man work units on a farm is calculated by multiplying the number of acres in each crop and the number of each kind of livestock by units which have been established on the basis of the average amount of time required to handle one acre or one animal.

A man equivalent represents one man on the farm for one year. If we divide the total man work units on the farm by the number of man equivalents, we then have work units per man as a measure of labour efficiency.

The relationship of work units per man to labour income is shown in Table 17. As the efficiency of labour increased, labour income increased. In the group of orchards with less than 100 work units per man, the average labour income was \$440, whereas in the group with 140 or more work units per man, the average labour income was \$2,243.

Labour incomes, as shown in Table 17, increase with labour efficiency. However, these increases in labour income may be due to some extent to other factors such as yield and size of business. If these other influences are held constant and labour incomes still increase with increased labour efficiency, it can then be stated that the variations shown in labour income are due to differences in labour efficiency.

Table 17.- Relationship of Work Units per Man and Labour Income,
153 Okanagan Valley Orchards, 1948-49

P.M.W.U. per Man	Number of Orchards	Average	
		P.M.W.U. per Man	Labour Income
Less than 100	45	82	440
100 to 139	47	122	1,392
140 and over	61	191	2,243
All orchards	153	138	1,448

On the 16 orchards having fewer than average work units per man, the average labour income was -\$57 whereas on the 16 with more than average work units per man, the average labour income was \$2,247.

Table 18.- Relation of Work Units per Man to Labour Income,
32 Okanagan Valley Orchards, 1948-49 a/

Factor	P.M.W.U. per Man below Average	P.M.W.U. per Man above Average
Number of Orchards	16	16
Per Cent Income from Apples	80	81
No. of Boxes sold per Acre	395	396
Total P.M.W.U.	240	255
P.M.W.U. per Man	111	159
Labour Income	-\$57	\$2,247

a/ The orchards were divided into two groups: (1) those in which productive man work units per man were below the group average (138); and (2) those in which they were above average. Then records from group (1) were paired with records from group (2) which were similar in three other respects: (a) percentage of income from apples (b) yield measured by the number of packed boxes sold per adjusted acre, and (c) in total man work units (Size).

In the group of farms having high labour efficiency, less time was spent in pruning, thinning and propping than in the group of low labour efficiency.

Size of Business

Size may be measured in a number of ways. Two measures used in this study are: crop acres and total man work units.

Crop Acres.— The relationship between crop acres and labour income is illustrated in Table 19. The larger the crop acreage per farm, the higher

the labour income. Most of the crop acreage is in orchard.

Table 19.- Crop Acres and Labour Income, 153 Okanagan Valley Orchards, 1948-49

Size in Total Crop Acres	Number of Orchards	Average Labour Income
		\$
Northern Okanagan:		
Less than 10	19	687
10 to 19.9	25	1,224
20 and over	22	3,397
Southern Okanagan:		
Less than 10	35	691
10 to 19.9	35	1,353
20 and over	17	1,887

Total Man Work Units.- A more inclusive measure of size than total capital or crop acres is the number of productive man work units. This takes into consideration all the income producing enterprises on the farm. The relationship between total productive man work units per farm and labour income is shown in Table 20. The average labour income per orchard varied from \$705 in the group having less than 160 productive man work units to \$2,964 in the group having 360 or more productive man work units.

Table 20.- Relation of Productive Man Work Units to Other Measures of Size and Labour Income, 153 Okanagan Valley Orchards, 1948-49

Productive Man Work Units	No. of Farms	Average per Farm					Labour Income
		Farm Capital	Adjusted Apple Acreage	Crop Acres	Man Equivalent		
		\$					\$
Less than 160	34	14,581	4.2	7.4	1.39		705
160 to 259	51	21,074	7.7	11.0	1.68		806
260 to 359	28	38,751	10.7	15.8	2.11		1,370
360 and over	40	46,022	21.1	33.1	3.49		2,964
All Orchards	153	27,559	11.0	16.7	2.17		1,448

Percentage of Receipts from Fruit other than Apples

Another factor which seemed to affect the labour incomes of the orchards studied was the proportion of total receipts derived from fruit other than apples. In areas suitable for the growing of soft fruit, the farms which derived part of their income from this source had higher labour incomes than the farms which derived all their income from apples. This suggests that there is an advantage in diversification. The growing of other kinds of fruits enables the operator to distribute his labour more evenly throughout the year, and also reduces the element of risk. The records also indicate that gross returns per acre are higher from soft fruit than from apples.

COMBINED EFFECT OF EFFICIENCY FACTORS

The effects of such efficiency factors as yield, percentage of culls, labour efficiency and size of business on labour income have been illustrated. While each of these factors has been shown to be important in its influence on labour income and some are more important than others, those farms which were above average in the greater number of these factors had the highest labour incomes. It would appear from a study of the data that yield, size of farm business and labour efficiency have the most pronounced effect on labour income.

a/
Table 21.- Effect of Four Efficiency Factors on Labour Income,
153 Okanagan Valley Orchards, 1948-49

Number of Factors Average or Higher	Northern Okanagan		Southern Okanagan	
	No. of Orchards	Average Labour Income	No. of Orchards	Average Labour Income
		\$		\$
0	5	-1648	7	-206
1	21	457	31	672
2	21	2119	30	1138
3	13	2869	16	3130
4	6	2936	3	3521

a/s Factor

Measure Used

- (a) Yield
- (b) Percentage Culls
- (c) Labour Efficiency
- (d) Size of Business

- Number of packed boxes sold per adjusted acre
- Percentage Culls
- P.M.W.U. per man equivalent
- Total P.M.W.U. per Farm

FARM INDEBTEDNESS

Debt was reported on 83 of the 153 orchards (Table 22). Fifty-five reported no indebtedness and the remaining 15 failed to disclose the necessary information or the data were incomplete.

The average indebtedness incurred during 1948 on the 83 farms was \$1,403. Payment on interest and principal amounted to \$123 and \$1,390 respectively. Indebtedness as of December 31, 1948 averaged \$3,201 per farm.

Table 22.- Farm Indebtedness, 153 Okanagan Valley Orchards, 1948-49

	Area		
	Northern Okanagan	Southern Okanagan	All Okanagan
Total Number of Records	66	87	153
Number reporting no debt	20	35	55
Number information undisclosed or incomplete	7	8	15
Number reporting debt	39	44	83
- dollars -			
Indebtedness on Jan. 1, 1948 (Farms reporting debt)	3,037	3,323	3,188
Debts incurred during 1948	1,453	1,358	1,403
Payments during 1948 Interest	114	131	123
Principal	1,354	1,422	1,390
Indebtedness as of Dec. 31, 1948	3,136	3,259	3,201

SALMON ARM

As previously stated, Salmon Arm is the only non-irrigated area from which records were taken and has, therefore, been treated separately. The organization and financial success of the 12 Salmon Arm orchards is presented in the following pages.

At Salmon Arm, the average size of farm was 52.5 acres, of which 17.2 acres were in bearing apples, 4.4 acres in non-bearing apples, 1.8 acres in other fruit, 4.0 acres in field crops, 6.7 acres in pasture and 18.4 acres of unimproved and waste land.

The average total capital invested was \$29,475, made up of \$18,491 in land, \$7,312 in buildings and \$3,672 in equipment, livestock and supplies. The average value of orchard land was \$676 per acre.

The receipts from the sale of apples amounted to \$5,682 per farm, or 64.8 per cent of the cash receipts, followed by miscellaneous receipts \$312,

livestock products \$262, other fruit \$223, rebates \$194 and field crops \$27.

Current expenditures on the average farm in Salmon Arm amounted to \$4,213, of which \$1,878 was for paid labour, \$412 for unpaid labour, \$308 for spray material, \$370 for operating equipment, \$194 for handling culls, \$184 for fertilizer, \$174 for taxes, \$51 for custom work and \$642 for insurance, repairs, feed, seed and other miscellaneous items.

The average labour income on the 12 orchards studied in the non-irrigated Salmon Arm area was \$738 as compared with \$1,448 for the rest of the orchards in the irrigated areas of the Okanagan Valley. Comparative averages are listed in Table 23.

Table 23.- Comparative Averages, Irrigated and Non-Irrigated Orchards, 165 Okanagan Orchards, 1948-49

	Average per Orchard	
	Irrigated Vernon & South (153 records)	Non-irrigated Salmon Arm (12 records)
Total Acres	24.4	52.5
Acres in Apples	11.9	21.6
Acres in other fruit	3.2	1.8
Total Capital Investment	\$ 27,559	\$ 29,475
Value per orchard acre	\$ 1,150	\$ 676
Yield per adjusted acre (packed boxes)	462	318
Percentage Culls	15	21
Receipts:	- dollars -	
Apples	5,194	5,682
Other fruit	1,969	223
Rebate	414	194
Field Crops	50	27
Livestock Products	59	262
Miscellaneous Receipts	197	312
Capital Receipts	103	21
Net Inventory Increase	516	603
Total Farm Receipts	8,502	7,324
Current Expenses	4,843	4,214
Capital Expenses	1,109	1,193
Net Inventory Decrease	-	-
Total Farm Expenses	5,952	5,407
Farm Income	2,550	1,917
Interest on Investment (4%)	1,102	1,179
Labour Income	1,448	738
Perquisites	668	826
Labour Earnings	2,116	1,564

Orchards at Salmon Arm require less labour per tree for tasks such as pruning, thinning and picking than do orchards with irrigation. The reason is that the yield per tree is lower and the rate of growth is not as fast as it is under irrigation.

Table 24.- Average Number of Man Hours Required Per Tree, Irrigated and Non-Irrigated Orchards, 165 Okanagan Valley Orchards, 1948-49

Item	Man Hours per Tree	
	Irrigated	Non-Irrigated
	Vernon and South	Salmon Arm
	(153 records)	(12 records)
Pruning	1.04	0.96
Cultivating	0.06	0.07
Irrigating	0.45	-
Spraying	0.27	0.23
Thinning	1.51	0.99
Other	0.56	0.15
Total Growing	3.89	2.40
Picking	1.42	0.94
Loading and Hauling	0.30	0.34
Total Harvesting	1.72	1.28
Total Labour	5.61	3.68

TRENDS

In addition to supplying data regarding their farm businesses for 1948, 37 operators were able to give their total farm receipts and total expenses for the years 1943 to 1947, inclusive. The apple acreage on these farms remained constant during this period. Thirty of these men were able to itemize their main expenses such as paid labour, land taxes, water taxes and tolls, fertilizers, sprays, custom work hired and use of machinery (Table 25).

Table 25.- Comparison of Principal Items of Expense on 30 Tree Fruit Farms, Okanagan Valley, 1943 to 1948 inclusive.

	1943	1944	1945	1946	1947	1948
- dollars -						
Average Land Taxes	140	136	148	164	161	159
Water Taxes	163	182	183	209	219	261
Fertilizer	190	248	308	251	294	282
Spray	327	422	512	534	688	486
Use of Machines	242	378	421	435	397	516
Custom Work	289	411	361	453	309	259
Paid Labour	1,671	2,734	2,826	3,630	3,487	3,794

In Table 26 the average receipts, expenses and net cash incomes of these 37 farms are presented. It must be realized, however, that the changes in net cash incomes are due to many factors, such as, prices, weather conditions, yields and changes in cultural practices. The average size of the 37 farms considered was 23.8 acres, of which 17.6 acres were in orchard.

Table 26.- Average Receipts, Expenses and Net Cash Incomes of 37 Tree Fruit Farms in the Okanagan Valley during Six Consecutive Years

Year	Total Cash Farm Receipts	Total Cash Farm Expenses	Net Cash Income
- dollars -			
1943	7,015	3,688	3,327
1944	9,819	5,344	4,475
1945	10,147	5,800	4,347
1946	11,175	6,798	4,377
1947	11,924	6,915	5,009
1948	11,059	7,130	3,928

COMPARISON OF ORCHARDS INCLUDED IN BOTH THE 1940 AND 1949
SURVEYS OF APPLE PRODUCTION IN THE OKANAGAN VALLEY

In 1940 a similar survey was conducted in the Okanagan Valley. To compare the organization and financial success of the orchards which were under both surveys, only those records having approximately the same acreage in orchard in 1940 and 1949 were used. There were 62 representative growers from the Northern and Southern Okanagan whose farms met this qualification.

The following table gives the comparative averages for the 62 orchards which were under both the 1940 and 1949 surveys.

The average estimated capital investment increased from \$13,709 in 1939 to \$32,214 per farm in 1948. Orchard land values increased on the 62 farms from \$553 per acre in 1939 to \$1,238 per acre in 1948.

In 1939, 11 of the 62 orchardists owned tractors, 17 owned trucks and 38 owned automobiles. In 1948, 47 of the 62 orchardists owned tractors, 20 owned trucks and 49 owned automobiles.

There was little difference between the yield per bearing acre in 1939 and 1948 - 430 and 436 packed boxes sold per bearing acre, respectively.

Table 27.- Comparative Averages for 62 Orchards, under both 1940 and 1949 Surveys of Apple Production in the Okanagan Valley.

Item	Average	
	1939 (62 records)	1948 (62 records)
Acres in Apples	13.6	13.2
Acres in other fruit	3.1	3.8
Yield of Apples (number of packed boxes sold per Acre)	430	436
- dollars -		
Total Investment	13,709	32,214
Investment in Buildings	2,768	7,466
Investment in Land	9,725	21,339
Investment in Equipment	1,124	3,335
Value of Orchard Land per Acre	553	1,238
Gross Returns per Box of Apples	0.50	1.17
Receipts:		
Apples	2,516	5,847
Other Fruit	680	2,402
Rebates	-	547
Other Crops	46	2
Livestock	48	90
Miscellaneous	109	216
Capital Receipts	-	106
Inventory Increases	-	199
Total	3,399	9,409
Expenses:		
Current	2,044	5,823
Capital	131	959
Inventory Decrease	78	-
Total	2,253	6,782
Farm Income	1,146	2,627
Interest (4%)	548	1,288
Labour Income	598	1,339
Perquisites	299	696
Labour Earnings	897	2,035

The orchard operations which showed the greatest change were pruning, thinning, fertilizing and irrigating (Table 28).

In 1939, pruning took an average of 0.87 hours per tree, thinning took 1.02 hours per tree, fertilizing 0.03 hours per tree and irrigating took 0.57 hours per tree; in 1948 they took 1.27, 1.88, 0.06 and 0.35 hours per tree, respectively. The only orchard operation which required less time in 1948 was irrigating.

Table 28.- Man Hours of Labour Required per Tree for Various Orchard Operations in 1939 and 1948, Okanagan Apple Orchard Surveys, 1940 and 1949.

Item	Man Hours per Tree	
	1939 (62 records)	1948 (62 records)
Pruning	0.87	1.27
Cultivating	0.12	0.20
Fertilizing	0.03	0.06
Irrigating	0.57	0.35
Spraying	0.35	0.40
Thinning	1.02	1.88
Propping	0.13	0.12
Other	0.08	0.11
Total	3.17	4.39

Apple receipts increased from \$2,516 per farm to \$5,847 per farm; an increase of 132 per cent. Receipts from fruit other than apples showed the greatest increase, from \$680 per farm in 1939 to \$2,402 per farm in 1948, an increase of 253 per cent. Total farm receipts were \$3,399 per farm in 1939, and \$9,409 per farm in 1948, an increase over the nine-year period of 177 per cent.

Total farm expenses increased by 201 per cent, from an average of \$2,253 to \$6,782 per farm.

In 1939, the average labour income on the 62 farms was \$598 as compared to \$1,339 in 1948.

SUMMARY

Fifty-four per cent of the orchards of five acres or larger in the Okanagan Valley are located south of Kelowna and fifty-three per cent of the 165 records collected in this survey were taken from that area.

For purposes of analysis the records were divided into three groups: Northern Okanagan (66 records), Southern Okanagan (87 records) and Salmon Arm (12 records).

The average size of farm in the Northern Okanagan was 29.2 acres of which 16.3 acres were in apple trees and 2.1 acres in other fruit trees. In the Southern Okanagan the farms were, smaller, the average size being 21.1 acres of which 8.7 acres were planted to apple trees and 4.1 acres to other fruit trees. At Salmon Arm the average size of farm was 52.5 acres, of which 21.6 acres were in apples and 1.8 acres in other fruit. The average value of orchard land as estimated by the farm operators was \$886, \$1,421 and \$676 per acre in the Northern Okanagan, Southern Okanagan and Salmon Arm districts, respectively.

The average investment was \$25,815 per farm in the Northern Okanagan, \$28,880 per farm in the Southern Okanagan and \$29,475 per farm in the Salmon Arm district. In all cases the major investment was in land.

Receipts from the sale of apples made up 77 per cent, 56 per cent and 85 per cent, respectively, of the total cash receipts on the average farm in the Northern and Southern Okanagan and Salmon Arm districts. The average cash receipts per farm in each of the three areas were \$8,718, \$7,249 and \$6,700, respectively.

The average current operating expenses on the farms studied in the Northern Okanagan were \$5,457, in the Southern Okanagan \$4,377 and in the Salmon Arm district \$4,214. In all three districts hired labour was the major expense, accounting for 46.3 per cent, 49.1 per cent and 44.6 per cent of the total current expenses.

The average labour income, after allowing interest at four per cent on the total investment, was \$1,786 in the Northern Okanagan, \$1,191 in the Southern Okanagan and \$738 in the Salmon Arm district.

The most important factors affecting labour income were yield, percentage of culls, size of the farm business, and labour efficiency.

Thirty-seven farmers were able to provide data regarding their farm receipts, farm expenses and net farm income for the years 1943-48 inclusive. The average net cash income on these 37 farms was \$3,327 in 1943, \$4,475 in 1944, \$4,347 in 1945, \$4,377 in 1946, \$5,009 in 1947 and \$3,928 in 1948.

On 62 of the orchards in the 1949 survey, records had also been taken in a similar survey conducted in 1940. The average labour income of these farms was \$598 in 1939 and \$1,339 in 1948.

APPENDIX

Definition of Terms

Total Farm Investment. - is the average of the beginning and ending inventory values of the farm house, other buildings, land, machinery and equipment, live-stock and feed and supplies.

Farm Income. - is the gross income including increases in inventory less the cash expenses, any decrease in inventory, the depreciation on the capital goods employed, and an estimated value of the unpaid family labour.

Labour Income. - is the farm income less interest (calculated at four per cent in this study) on the total farm investment.

Perquisites. - Represent the value of all products raised and consumed on the farm and the use of the farm dwelling for the year.

Operator's labour Earnings. - are labour income plus perquisites and represent the total return to the operator for his year's work after all cash and non-cash expenses have been deducted.

Productive Man Work Unit. - This is a measure of the amount of work to be done on the farm and as such is a measure of the size of the farm business. A P.M.W.U. is the average amount of directly productive work accomplished by a

man in 10 hours. The number of P.M.W.U. on a farm is calculated by multiplying the acres of each crop and the number of each kind of animals by units which have been established on the basis of the average amount of time required to handle one acre or one animal.

Table A.- Standards Used in Calculating Productive Man Work Units

Item	:	:	:
	Productive	Item	Productive
	Man Work		Man Work
	Units per		Units per
	Acre		Animal
Apples and Pears	20.0	Cows	15.0
Peaches, Apricots and Cherries	11.5	Heifers	1.3
Prunes and Plums	9.0	Calves	2.3
Young Orchard	2.5	Bulls	7.5
Strawberries	58.0	Steers	1.3
Cane Fruits	50.0	Brood Sows	
		with Litter	3.0
Potatoes	10.0	Market Hogs	1.0
Alfalfa Hay	2.3	Laying Hens	0.3
Other Hay	1.0	Bees	0.5
Small Grains	2.0		

One day of labour on work off the farm was considered as one P.M.W.U.

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